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EXAMINER

NGUYEN, HOA CAO

ART UNIT PAPER NUMBER

2841

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12/04/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/761,343

Applicant(s)

CHAN ET AL.

Examiner

Hoa C. Nguyen

Art Unit

2841

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendment filed on 9/10/07 has been entered.

Claim Objections

2. Claims 2-12 are objected to because of the following informalities:

Regarding claim 2, on line 8 of claim 2, the 'R(i)' must be changed to --R(j).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 2, the limitation ' $i < 2$ ' (so $i = 1$ is the only probability) does not particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner believes that ' $2 \leq i < n$ ' is what it should be, because the description from the specification and the drawings (figures 3, 4a, 4b) clearly shown column 'i' can be any where from 2 to 'n', where 'i' defines a specific column within 'n' number of columns. At least, the structure shown in figures 3, 4a, and 4 discloses ' $i = 3$ ' (figure 3), or ' $i = 4$ ' (figure 4a), or ' $i = 2$ ' (figure 4b). Furthermore, it is noted that Col(i) is where a free space is set up, and it is unreasonable to set up a free space at the edge of the PCB (which is $i = 1$).

Thus for continuing examination, the Examiner assumes ' $2 \leq i < n$ '.

Regarding claims 5-6, the limitation regarding the COL(i) and c(i) do not particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) The shared vias is not in COL(i), but in COL(i+1). For continuing examination, the Examiner assumed COL(i+1) is correct, instead of COL(i).

(b) Power contact pads connecting to a power shared via COL(i+1) should be in at c(i+1) and c(i+2). Thus, for continuing examination the power contact pads at c(i+1) and c(i+2) are considered.

(c) With the same logic as above, the ground contact pads at c(i+1) and c(i+2) are considered.

It is noted that the shared vias can be in COL(i-1) or COL(i+1), but can never be in COL(i), since COL(i) is where a free space is set up.

Regarding claims 7-8, similarly to claims 5-6 above, the Examiner assumed COL(i+1) is correct, instead of COL(i). And, the power contact pads connecting to a power shared via COL(i+1) should be at c(i+1) and c(i+2).

However, by assuming $i=3$, $j=4$, $m=1$, then based on claim 2, the power shared via is at {COL(4), R(4)} and the ground shared via is at {COL(4), R(5)}, the power contact pads are at {c(4),r(4)} and {c(5),r(5)}, and the ground contact pads are at {c(4),r(5)} and {c(5),r(6)}. The Examiner believes there is an error in such arrangement of pads; because with this arrangement, for each ground and power via there is at least one pad formed 3 rows down from its connected via.

For example, the power via at {COL(4), R(4)} has one of its pad at {c(5), r(5)}, which is 3 rows down from row R(4). That is from R(4) to r(4), R(5), and then resides at r(5).

The Examiner has tried to fix the error by moving the via back 1 row by changing the r(j+1) to r(j). However, this will lead to the same structure as shown in claims 5-6. Therefore, the Examiner does not know what the actual structure the applicants try to claim. Because of this reason, claims 7-8 are withdrawn from consideration in this Office action.

Regarding claims 9-10, with exactly the same analysis as shown in the above paragraph, claims 9-10 are also withdrawn from consideration in this Office action.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by Clarkson et al. (US 20030043560, hereafter Clarkson).

Regarding claim 1, at least as shown in figures 2A-4B, Clarkson discloses a printed wiring board for mounting a high performance ball grid array (BGA) device on one side of the PWB comprising:

(a) a modified vias array (circular shapes as shown in the figures, see figure 2 for example),

(b) the modification being that at least a portion of one column of vias array (considering column 4 from left, figure 2A for example) is missing at least two adjacent vias (arbitrarily selecting any two vias in column 4), wherein the missing vias have been replaced by respective shared vias in an adjacent row (see figure 4B, paragraph 30, ground/power vias and decoupling capacitors), and the shared vias have been connected to either a power supply or a power return (par.30)

(c) a via pad (square shapes as shown in the figures) for each shared vias (every via has a via pad) located on the other side of the PWB in the portion,

(d) whereby a decoupling capacitor (no reference number, see figures 4A-B, capacitors are mounted to power and ground vias, see paragraph 30) can be electrically connected across the pair of via pads to decouple the power supply and the power return at the two adjacent vias.

Regarding claim 2, at least as shown in figures 2A-4B, Clarkson discloses a printed wiring board (PWB) for mounting a high performance integrated circuit, comprising:

(a) on a top side of the PWB (figure 4A for example), a modified via array with BGA columns and BGA rows of ball connection pads (see figures 2A-B for clearer illustration of vias and pads);

(b) a modified vias array of plated through hole vias (see par.18, columns 180-187), with each via column Col(n) arranged between two respective BGA columns c(n)

and $c(n+1)$ and each via row $R(k)$ arranged between two respective BGA rows $r(k)$ and $r(k-1)$,

(c) wherein 2 vias (considering $m=1$) of the via column $Col(i=5)$ placed in successive via rows $R(j=2)$ to $R((2+2-1)=3)$ of the modified vias array are depopulated (removed vias, see channel 130/135 in figures 2A-2B for example and par. 25) to obtain a free space on the back side of the PWB, and

(d) wherein 2 corresponding vias (considering $m=1$) in a via column $C(6)$ adjacent to column $Col(5)$ and placed in the successive rows $R(2)$ to $R(3)$ of the vias array are shared vias (ground and power vias, see par.30), and

(e) wherein $n>1$, $k>2$, $i<n$, $j<k$.

Regarding claim 3, as shown in figures 2A-2B, Clarkson discloses the free space has a width $D1$ equal to twice the pitch D of the vias array less a via size (clearly shown in the figures, also see par. 27), for accommodating 1 passive elements of a substantially similar width $D1$ (see par. 30).

It is noted that the limitation "for accommodating m passive elements of a substantially similar width $D1$ " is interpreted to only require the ability to so perform. In the case of product claim, only the structure of the claim distinguishes over the prior art. Furthermore, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ 2d 1647 (1987).

Regarding claim 4, Clarkson discloses m is at least one.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarkson.

Regarding claims 11 and 12, Clarkson discloses every limitation as shown in claim 3 above, but fails to disclose the passive elements are 0603, 0402, 0201 or smaller decoupling capacitors/resistors.

It is noted that a selection of the type of passive component and its sizes is only a matter of design choice depending upon particular applications.

Therefore, it would have been an obvious matter of design choice to select the decoupling capacitors or resistors in the sizes of 0603, 0402, 0201 or smaller in order to meet a specific requirement of a particular application, since such modification would have involved a mere change in size of a component. Furthermore, a change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Allowable Subject Matter

11. Claims 5-6 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Reasons for allowance

12. The following is an examiner's statement of reasons for allowance:

Regarding claims 5-6, the best prior art reference, Clarkson et al. (US 20030043560), fails to teach or fairly suggest, at least on claim 5, in combining with other limitations, a first shared via in the via column Col(6) and the via row R(2) provides a power contact to a first associated ball contact pad in the column c(6) and row r(2) and to a second associated ball contact pad in the column c(7) and the row r(2). None of the reference art of record discloses or renders obvious such a combination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

Response to Arguments

13. Applicant's arguments filed on 9/10/07 have been fully considered but they are not persuasive.

Remarks, page 8: The argument is centered about that the reference art fails to disclose the "respective shared vias". Applicants further stated that the Examiners agreed with the argument.

Regarding the shared vias, after further review of the specification, the shared vias are indeed power/ground vias formed next to a depopulated column of vias. For such structure, the reference art does indeed disclose. For example, any two vias next

to the channels (see figure 2A for example) can be used to served as power/ground vias and the capacitor can be mounted right on the channel (see figures 4A-4B and claim 2 above).

Regarding the agreement, the Examiner only agreed to further review the reference with the regard to the shared vias (see Interview Summary mailed on 8/30/07).

Examiner remarks: A request for a personal interview is welcomed to further discuss the limitations in claims 5-10.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoa C. Nguyen whose telephone number is 571-272-8293. The examiner can normally be reached on M-F.

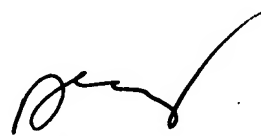
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hoa C. Nguyen
11/23/07



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